

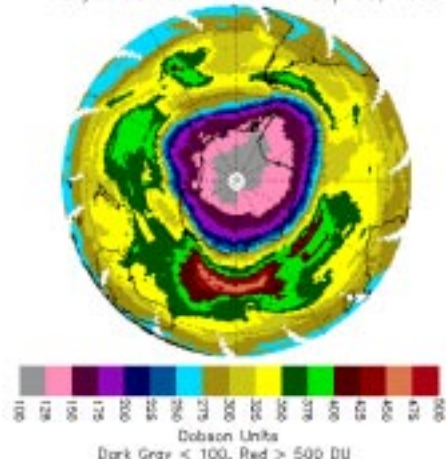
# Ozone Mapping and Profiler Suite (OMPS)



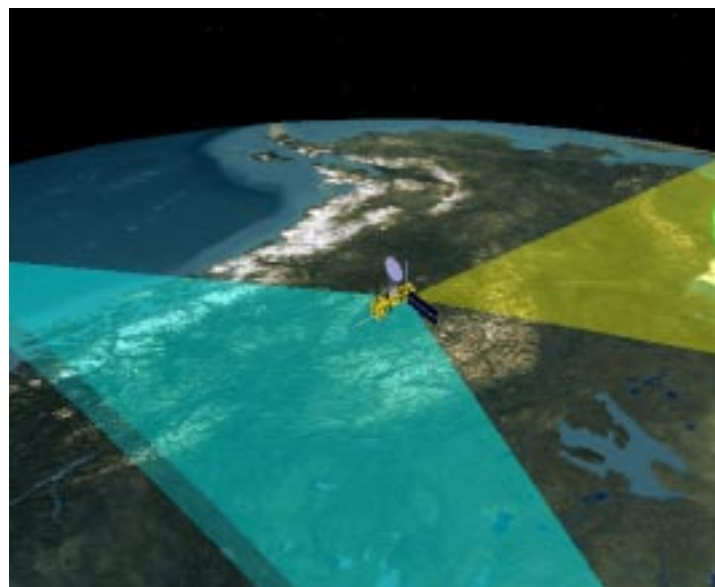
The Ozone Mapping and Profiler Suite (OMPS) monitors ozone from space. OMPS is the first suite selected to fly on the National Polar-orbiting Operational Environmental Satellite System (NPOESS) spacecraft - the next generation of polar-orbiting environmental satellites. NPOESS replaces the two current programs -- the National Oceanic and Atmospheric Administration's (NOAA) Polar-orbiting Operational Environmental Satellites (POES) and the Department of Defense's Defense Meteorological Satellite Program (DMSP).

OMPS will collect total column and vertical profile ozone data and continue the daily global data produced by the current ozone monitoring systems, the Solar Backscatter Ultraviolet radiometer (SBUV)/2 and Total Ozone Mapping Spectrometer (TOMS), but with higher fidelity. The collection of this data contributes to fulfilling the U.S. treaty obligation to monitor the ozone depletion for the Montreal Protocol to ensure no gaps on ozone coverage.

EP/TOMS Total Ozone for Sep 30, 1999



The Ozone Hole over the South Pole as measured



OMPS aboard the NPOESS satellite measuring columnar Ozone and vertical distribution of Ozone

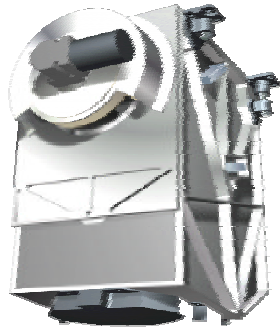
## NPOESS Mission Characteristics

Orbit	Sun-synchronous orbit
	833 km altitude
	~ 98 degree inclination

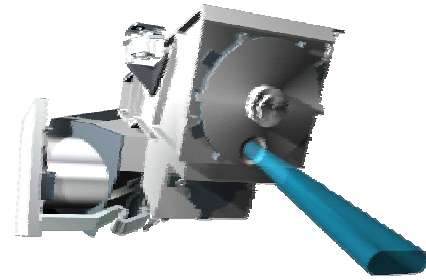
## OMPS Mission Products

Primary	Total Ozone Amount Nadir Vertical Ozone Profile Limb Vertical Ozone Profile IR Total Ozone Calibrated Radiances
Secondary	SO2 Index Aerosols (Index and Profile) UV-B radiance on earth's surface NO2 Surface Albedo Cloud Top Height

In addition to providing operational ozone data products, OMPS has the potential to provide other surface and atmospheric science data, including anthropogenic trace gases.



**OMPS Nadir Sensor**



**OMPS Limb Sensor**

The OMPS is comprised two sensors -- a nadir sensor and a limb sensor.

The nadir sensor uses a wide field-of-view push-broom telescope to feed two separate spectrometers. The nadir total column spectrometer (mapper) measures the scene radiance between 300 to 380 nanometer (nm) with a resolution of 1 nm sampled at 0.42 nm and a 24-hour ground revisit time. Measurements from this spectrometer are used to generate total column ozone data with better than 50 x 50 kilometer (km) resolution at nadir. The nadir profile spectrometer measures between 250 and 310 nm with the same spectral sampling, in a single ground pixel of 250 x 250 km.

The limb sensor measures the along-track limb scattered solar radiance with 1 km vertical sampling in the spectral range of 290 to 1000 nm. Three vertical slits sample the limb at 250 km cross-track intervals to provide for better than 7-day ground revisit times. The three slits are imaged onto a single charge-coupled device (CCD) (identical to both nadir CCDs).

Both sensors maintain long term data product stability through periodic solar irradiance measurements.

An Interface and Control Electronics (ICE) box and a ground processing and algorithm segment process the data obtained by the sensors to generate geolocated and calibrated radiances and ozone data products. The OMPS program will create five ozone data products:

- High performance Total Column environmental data record (EDR) product
- Heritage TOMS V7 Total Column data records
- High performance Ozone Profile product
- Heritage SBUV/2 Nadir Profile data records
- IR Total Column data records from Cross-track Infrared Sounder (CrIS) radiances

#### **OMPS Instrument Characteristics**

##### **Spectral Range**

Nadir mapper	300 - 380 nm
Nadir profiler	250 - 310 nm
Limb profiler	290 - 1000 nm

##### **Spectral Sampling Interval**

Nadir mapper	2.4 pixels per FWHM
Nadir profiler	2.4 pixels per FWHM
Limb profiler	2.0 pixels per FWHM (Full Width Half Maximum)

##### **Spectral Resolution (FWHM)**

Nadir mapper	1.0 nm
Nadir profiler	1.0 nm
Limb profiler	1.5-40 nm

##### **Field-of-View (FOV)**

Nadir mapper	110 x 0.3 deg
Nadir profiler	16.7 x 0.3 deg
Limb profiler	8.5 x 2.7 deg (3 sets)

##### **Revisit time**

Nadir mapper	24 hours
Limb profiler	4 days (average)

##### **Mass**

45 kg

##### **Power**

45 W

##### **Data rate**

40 kbps

##### **Size**

35 x 54 x 56 cm

##### **Total Column EDR**

Horizontal Cell Size: 50 km at nadir  
Measurement Range: 50 – 650 Dobson Units (DU)  
Accuracy: 15 DU or better  
Precision: 3 DU + 0.5% or better  
Long-term Stability: 1% over 7 years

##### **Ozone Profile EDR**

Vertical Coverage: Tropopause – 60 km  
Vertical Cell Size: 3 km      Horizontal Cell Size: 250 km  
Measurement Range: 0.1 – 15 ppmv  
Accuracy: 10% (15 – 60 km), 20% (trop –15 km)  
Precision: 3% (15 – 50 km), 10% (trop –15 km, 50 – 60 km)  
Long-term Stability: 2% over 7 years

The first launch of the NPOESS 13:30 afternoon spacecraft, planned to carry an OMPS sensor suite, is not expected before 2008. Earlier flights of opportunity are being considered for OMPS. The OMPS is designed, developed, and manufactured by Ball Aerospace & Technologies Corp. Raytheon ITSS and Atmospheric and Environmental Research, Inc. are developing the science algorithms.